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ABSTRACT

Focusing on interactive television systems that provide both audio and visual online communication between and among all sites, this paper begins by describing and analyzing a sampling of data on existing programs. The characteristics of existing interactive television instructional programs are described, including course offerings (primarily academic courses with low-enrollment and/or limited staff, and special interest courses); grade levels (more than 90% are offered at the high school level and the remainder at the advanced level of middle school); and instructional and supervisory considerations (teaching methods have been primarily traditional with the focus on the teaching process rather than on student learning). Potential enhancements to the instructional process through the use of interactive television are then explored with emphasis on the use of technology as the catalyst for educational change and the development and implementation of technology as one component of a broad-based educational improvement plan. Topics discussed include encouragement and rewards for supporters and users of the system; curriculum and teaching methods that take advantage of the medium; classroom enhancements (facsimile machines, computers, split screen television, remote control cameras, location of the ITV classroom); personalization of instruction; and staff development. Finally, specific implementation strategies are recommended, both for short and long term integration of interactive television instruction into ongoing instructional programs. (5 references) (EW)

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THE CRISIS OF DISTANCE LEARNING - A DANGEROUS OPPORTUNITY

Prepared for the
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The Crisis of Distance Learning -A Dangerous Opportunity

The purpose of this paper is threefold:

A. to describe and analyze a sampling of data on existing interactive television instructional programs, with respect to course offerings, grade levels and instructional and supervisory requirements of effective implementation;
B. to explore potential enhancements to the instructional process through the use of interactive television;
C. to recommend specific implementation strategies, both short and long term for the integration of interactive television instruction into ongoing instructional programs.

Distance Learning is characterized by the use of technology to link teachers and learners who are physically apart from one another. The type of technology somewhat dictates the type of instruction and curriculum content which can be employed . This paper focuses on interactive systems which provide both audio and visual on-line communication between and among all sites.The transmission is provided through a cable system or microwave dish.

Interactive television (ITV) provides educators with a "dangerous opportunity." We can embrace the new technology and explore ways to extend and expand effective instruction, innovative curriculum, learning and teaching styles . We can push out the confining classroom walls into new frontiers no longer limited by physical proximity. OR we can merely use the technology to transmit conventional instruction to remote sites. OR even worse we can extend mediocrity and ineffective instruction beyond one classroom into many!

CHARACTERISTICS OF EXISTING INTERACTIVE TELEVISION PROGRAMS (ITV)

Because the technology of interactive television is still at an early developmental stage, programming utilizing this technology remains scattered and often idiosyncratic in design, implementation, and evaluation. Thus, no sampling of data for programming in the field can be truly "representative." Furthermore, the designation "effective program" cannot be applied with any certainty, since neither clearly defined criteria for program effectiveness nor any comprehensive empirical data on student achievement seem to exist at this stage. Finally, the orientation of much of the present application of this technology - to provide courses which otherwise would not be able to be offered due to minimal numbers - skews the data in favor of traditionally marginal courses rather than toward courses which are specifically judged to be suited to interactive television instruction. The "utility" of interactive television toward this end seems clear. Whether this is actually the most appropriate use of the technology awaits both evaluation of existing programs and further research into curricular areas not presently addressed by interactive television programs.

Curricular Design

Generally, the thrust of innovations using interactive television falls into four categories:

A. specific low-enrollment courses - advanced Mathematics, Science and Business courses, end-of-sequence courses such as specialized English or Social Studies courses;

B. low-enrollment course sequences - particularly foreign languages tracks where enrollments are low at each level of the course (Latin, German, French in particular).

C. limited-staff courses - essentially in specialized areas where qualified staff and/or instructional resources are only available in one of a group of participating school districts (astronomy, organic chemistry, European literature); and

D. special-interest courses - idiosyncratic offerings corresponding for the most part to the particular talents of a single staff member in one of a group of participating school districts (Pilot's training, theater criticism, computer graphic design, etc.).

To this point, interactive television has been used either to facilitate the offering of otherwise impractical courses or to provide opportunities for specialized and often idiosyncratic

additions to the ongoing curriculum. What has not yet been attempted is the integration of this new technology into the core curriculum as part of the basic instructional delivery system.

It would be helpful, for example, to seek answers to the following questions:

A. What kinds of courses could make the most productive use of interactive television?

B. What kinds of learning styles can be successfully integrated with interactive television technology?

C. What age levels can be most appropriately taught using this technology?

D. To what extent can conventional video, audio-visual, computer facilities, etc. be integrated into a multi-faceted instructional "system?"

Course Offerings

Despite the early stage of development in interactive television instruction, it is already beginning to be a "technology of choice" in a range of curricular areas. Data was received on a variety of instructional innovations, offering a total of 110 different courses. The breakdown of these courses by subject area is as follows:

Academic Courses		
English	- 15	
Social Studies	- 4	
Mathematics	- 11	
Computers	- 4	
Science	- 8	
Foreign language	- 27	
Total Academic	- 76	(69% of sample)
Business Courses	- 13	(12% of sample)
Arts Courses		
Art	- 3	
Music	- 4	
Theater	- 3	
Total Arts	- 10	(9% of sample)
Occupational Education Courses	- 4	(4% of sample)
Personal and Professional Development Courses	- 7	(6% of sample)

The preponderance of academic (particularly advanced academic) courses in the survey is not surprising. Such courses have traditionally been taught in "chalk and talk" fashion (in contrast to vocational or arts courses, for example), thus making them more easily adaptable to televised broadcast. The unusually large number of foreign language courses offered testifies to the relative difficulty of providing such courses (in terms of both faculty and students) under normal circumstances. The significant number of (advanced) business courses is likewise a product of limited (and declining) enrollments in this area.

Two other aspects of this data warrant discussion. Within the above courses, approximately 75% represent "advanced" courses (upper level, advanced standing, and/or requiring special prerequisites) and about 25% are "regular" courses (traditional elements of or options within the standard curriculum) with virtually no "review" or "remedial" courses offered. Similarly, over 90% of these courses are offered at high school level (grades 9-12), with the remainder available primarily to the upper grades (advanced level) of middle school.

Because of the limited data available, it is difficult to draw any "negative" conclusions - e.g. courses which cannot work through interactive television. It is clear, however, that a wide range of academic and advanced business courses have been made to work effectively with a wide variety of populations. The unusually large number of foreign language courses (27% of the sample) indicate that interactive television has provided a practical solution to enrollment and staffing concerns in this area.

Instructional and Supervisory Considerations

Since this early stage of interactive television implementation has been directed essentially toward the practical solution of enrollment and staffing problems, it is not surprising that instructional planning, staffing, and supervision have been carried out with severe limitations in resources. Specifically:

A. Courses have been designed to implement existing curricula in most cases, with little or no adaptation to suit the specialized characteristics of interactive television.

B. Instructors have been selected based either on seniority in the teaching of the specified subject or because they are the only ones available to teach a given course.

C. Given the traditional roots of curricula and teachers, teacher training has focused on familiarization with the given technology, "talking head" presentation

techniques, and the logistics of serving scattered sites with class assignments, homework, and examinations.

D. Consistent with the centralization of instruction, local supervision has been essentially "disciplinary" - monitoring student attendance and behavior. Without a live teacher present in the satellite classroom, little emphasis has been placed on supervising the learning process from the standpoint of the students. Instead, the focus has been on the teaching process from the standpoint of the teacher.

Within the traditional course areas presently offered, it is clear that the passing on of information from teacher to student, the monitoring of specific student learnings, and the supervision of attendance and student behavior can indeed be carried out through the medium of interactive television. What is less clear is the broader applicability of the medium to instruction which demands the interchange of ideas, direct and immediate teacher-student interaction, or an "intimacy" of communication (Theater, creative writing, etc.). Also to be determined is the effectiveness of interactive television with students suffering from a past history of failure in academic pursuits. How, for example, will the remedial mathematics student respond to televised instruction? How effective will conventional "motivational" techniques be with "reluctant learners" in any curricula area if the teacher's sole direct connection with the students is through a cable? And how "relevant" will a social studies discussion of contemporary issues seem to students who see each other only in pixels?

Potential Enhancements to Instruction Through The Use of Interactive Television (ITV)

THE TECHNOLOGY PLAN EMPHASIS

1. Use technology to help solve educational problems and needs of the participating institutions by understanding the individual strengths and weaknesses of those institutions involved.

2. Develop long term commitments of time, resources, personnel and funding with a special emphasis on developing cooperative organizational structures and business/education partnerships.

3. Establish cooperative, fair, and realistic funding mechanisms for all start-up and on-going costs.

4. Institutionalize the technology system and cooperative structure by emphasizing involvement of all affected personnel in the planning process, developing reasonable

timelines for meeting goals and objectives, and considering the technology and the technology planning as an integrated whole.

5. Design the project with comprehensive implementation goals by emphasizing the use of technology as the catalyst for educational change and the development and implementation of technology as only one component of a broad-based educational improvement plan.

6. Attempt to identify variables that may inhibit progress, limit the educational impact, or eliminate the project, and work to control them.

7. Establish communication procedures at the onset of the project with all individuals or groups who are either involved with or affected by the project.

8. Recognize the evaluation process as an important decision making tool by using both internal and external sources for evaluation; implement findings on a regular basis; encourage constructive criticism; and periodically employ experienced evaluators.

A simple model can show the basic philosophy of the use of two-way interactive television:

ITV
Traditonal Classroom
Instructional Effectiveness
Catalyst for Instructional Effectiveness Staff Development
\+ An Educational Tool

Increased Quality Educational Opportunities

The interactive television simulates more closely than any other technology the traditional classroom environment, particularly the personal face-to-face interaction between teacher and students. ITV has been shown to be comparable to the traditional method of instruction in both teacher and student acceptance and achievement. Preparing a teacher with staff training for using the ITV as an instructional medium provides a catalyst for enhancing instructional effectiveness as well as reinforcing the perception of ITV as an educational tool. These qualities add up to increased educational opportunities for students, staff and the community.

9. Emphasize the importance of flexibility by adapting to the unexpected, listening to and exploring the ideas of others and overcoming problems creatively.

10. Use experienced specialists and consultants to save time, money, and frustrations. Do-it-yourselfers rarely succeed.

THE HUMAN PLAN EMPHASIS

1. Identify, encourage, and reward interested and enthusiastic supporters of the project by regularly asking for and implementing appropriate suggestions and ideas; provide incentives through praise, recognition, release time, or money; and, offer opportunities for teachers to meet, plan, attend workshops and participate in training sessions.

2. Provide a meaningful and continuing role for potential users of the system because these people will make the technology an effective educational tool and will contribute to either the success or failure of the project. Their participation in all stages of the planning, development, and implementation is necessary for the project's success.

3. Encourage staff to contribute and participate in a creative and innovative technology environment through experimentation, personalization of the training and idea sharing.

4. Provide a staff training component which consists of in-depth, on-going and meaningful content. Staff training prior to actually teaching on a technology system is the most essential aspect for ensuring success with the project.

CURRICULUM

To date, interactive television has been synonymous with traditonal low incidence high school classes in rural areas. However, many systems, either in the planning or operational stages, are exploring other options including community education, early childhood programs, community business inservice or seminars, junior high/middle school advanced classes and college credit classes as well as public service and cultural/arts events. One system wrote a grant proposal to a state arts board for planning a series of video tapes of artists explaining and demonstrating their craft to elementary school children. Another system has plans to have the Minnesota Orchestra perform over its ITV system.

How can an ITV system help to enhance a class? Mentors or guest speakers can reach a wider audience when featured on an ITV system. For example, a professional writer can interact with composition students in several different communities simultaneously rather than having only one class in only one location hear the writer or having students transported to a

central location. A science teacher can prepare a close-up, detailed look at an experiment and play this tape over the ITV system. Students at both the home site and remote sites have a better view of the experiment than they could crowding around the teacher in a traditional classroom. The tape can be replayed for review. For students who are homebound for an extended length of time, an ITV system gives them the chance to view the class live, if the ITV system is on cable, or to review tapes of the class at home. Homebound students, then, can keep up with their classes that are offered over ITV and still retain a feeling of being part of a class, rather than an isolated individual.

The classes most frequently offered at the secondary level are the first two years of a foreign language (German, Spanish and French primarily; Latin to a lesser degree) and advanced placement English and math. But the list of classes taught in Minnesota and Michigan over ITV also include shorthand, computer logic and computer-assisted drafting, beginning and advanced accounting, calculus, trigonometry, music theory and comprehensive musicianship, business theory, advanced composition, drama and humanities, physics, chemistry and agricultural opportunities.

Several ITV systems have advanced classes for junior high/middle school students, usually in mathematics, as well as college credit courses for high school students. The college credit classes are particularly significant in states like Minnesota which recently adopted the Post-Secondary Options Program (PSEOP), a program allowing high school juniors and seniors maintaining a 2.0 grade point average to take college courses at the expense of their school districts. However, for many qualified high school students, the distance to the nearest post-secondary institution is prohibitive. An ITV system provides the chance for school districts to have on-site instruction shared by several communities, instead of forcing students to drive long distances to the post-secondary institution or to not be able to participate in the program.

The younger segment of the student population is not being ignored, either. Many school districts are presenting early childhood programs over ITV and are discussing future expansion of art and language instruction in the elementary school level. Special education teachers are interested in the use of ITV for the evaluation of the progress their students are making, significantly decreasing the time that special education cooperative occupational and physical therapists and other specialists must spend traveling to each district in the cooperative. These professionals can see a child on the television monitor and ask questions of a classroom teacher and aides as effectively as being there in person.

Community education is another arena for ITV use. With shared

classes, more communities can offer a wider variety of educational opportunities by eliminating duplication of classes and programs. Cooperative seminars also attract the attention of granting organizations, For example, in the winter of 1987, one Minnesota project presented a series of informative programs on farm, financial and teenage stress with panels of experts addressing these important issues over ITV. Community members could either participate on a two-way interactive basis by going to the interactive classroom in their school district or one-way video and two-way audio by watching the program on the educational channel on cable television and calling in their questions or comments. This project was funded, in large part, by the Agricultural Extension Service of the University of Minnesota.

Community businesses, too, can benefit from ITV. Inservice programs, seminars, recertification classes all can be effectively presented. For example, law enforcement and fire department personnel could receive training programs for certification credits or owners of small businesses on the changes in the tax laws. Nurses, insurance agents and other professionals could also use the ITV system for delivering recertification classes. Courses in computer use, business communications or legislation affecting business are better presented in a two-way interactive format where people can address questions immediately to the experts.

CLASSROOM ENHANCEMENTS

Before deciding on a final classroom design and equipment list, several factors should be considered. The cost of enhancements to the basic classroom equipment list must be weighed against the educational benefits of the enhancements.

Facsimile Machines

Facsimile machines are being used in several projects to transmit papers from classroom to classroom. The facsimile machine will, within 15-60 seconds, transmit a copy of a paper to a remote classroom. A teacher could transmit a test to the students in the remote sites and provide more "spontaneous" paper exchange.

The cost of the facsimile machine ranges from approximately $1,500 to $4,500.

Computers

Computers have been used with ITV systems in a number of projects. Computer uses vary from project to project. Some projects use the ITV system to transmit the information on the teacher's or student's computer to remote locations for

demonstration. Other projects are using the computer as a facsimile machine or as part of a local area network for sharing computer programs.

The cost of computer use ranges from simply the cost of the computer (varies with model) to the added costs of modems and local area network software and additional computer hardware. The cost of adding computers to the ITV classroom may range from approximately $500 to several thousand dollars.

Alternatives to the use of fax machines and computers are the mail and/or buses that already travel among the school districts.

Split Screen Television

The use of split screen television is one way of showing all remote classrooms on one television monitor. The cost of split screen technology is approximately the cost of several 25" receiver/monitors. In TSA's opinion, the split screen technology makes the remote classroom sites even smaller and seemingly more remote than having each remote site presented on a 25" receiver/monitor.

Remote Control Cameras

One additional option is remote controls for the classroom cameras. The remote controls for zoom and focus can be added to each camera for approximately $100 per camera. Tilting and panning may be added for another additional $300 to $500 per camera. It is recommended that the zoom and focus functions be added initially.

The schools which will participate in this ITV project must determine for themselves which options are initially necessary and which ones can be added at a later date. TSA encourages the BOCES to survey operational ITV sites to determine which "enhancements" are being used and what the evaluation of the uses are.

Location (Repeated for Emphasis)

The location of the ITV classroom must be given much thought. The ideal classroom is longer than wide with carpeting on the floor. Most importantly, the classroom must be located in an area where there is indirect supervision potential, such as near the library, media center or principal's office.

A television monitor for supervision can be placed in the principal's office and/or in a commons area of the school where classes may be observed by students and teachers alike.

PERSONALIZATION

While the two-way interactive television system is the "next best thing to being there", it is still a technology delivery system that intrinsically has a degree of remoteness between the teacher and the students in the remote sites.

Due to this fact of remoteness, teachers and administrators must make greater efforts to add personal touches to the delivery system. The following recommendations should serve as guidelines for personalizing the ITV classes. The project committees should explore other methods of personalization on an on-going basis.

A. The teacher development program must encourage and require use of effective elements of instruction for all teachers who will teach via ITV. The emphasis must be on active participation.

B. The ITV teacher must meet with the entire class prior to the first scheduled class.

C. Learn all students' names immediately. During the first meeting of the class prior to scheduled class offerings, take Polaroid photographs of each student to make a seating chart. This chart should rotate weekly with students seated in back coming to the front row.

D. Schedule informal and formal meeting with the class during the school year.

E. Always teach to the camera. The camera is the student's eyes. Eye contact is critical to personalization.

F. Do not ignore the "home" site students. It is not uncommon for teachers to concentrate on the "remote" sites so much that they actually ignore the students in the classroom.

G. Attempt to use the video and audio technology to enhance presentations. The television equipment is a tool that can provide the teacher with effective ways to transmit information. Examples of this use include close-up lens shots, a variety of angles to shoot from, etc.

H. It is also recommended that each teacher travel periodically to each remote site to teach from those sites. The number of times this occurs should be determined.

I. Devise a formative evaluation to assess the success of a class. This evaluation might indicate changes in

procedures, teacher attention and other instructional concerns.

J. Be aware of school rivalries. Avoid pitting one school against another (one site vs. another). Try to have heterogeneous groups comprised at all sites.

K. Ascertain differences in student backgrounds particular to each district. Use group interaction times to help students whose academic backgrounds might be somewhat of a hindrance to their success.

L. Each Monday, check with students at each site as to what is happening that week that might interfere with class.

By encouraging and providing opportunities for teachers and facilitators to share information and experiences, more examples of personalization will be discovered. All of these examples should be placed in a handbook for teachers who will be teaching on ITV.

STAFF DEVELOPMENT

Staff development is the key to development of an educationally effective ITV system. Without well prepared teachers who feel comfortable with the technology, the system will be ineffectively used and become a waste of money.

All teachers who have an interest in ITV must be provided with an appropriate training session. This session should provide potential ITV teachers with some basic information and experiences. The following should be considered guidelines for an initial training session.

A. The session must provide hands-on guided practice for the use of the classroom technology.

B. Experienced ITV teachers must be present to answer questions, provide solutions to potential/perceived obstacles and to assist the teachers with any problems they may encounter in the training session.

C. The use of effective elements of instruction should be a major part of the training session and the technology can act as a catalyst for incorporating these elements into the teachers' classrooms.

D. The session must provide ITV teachers with a basic overview of the technology and how it works.

E. Teachers must teach over the ITV system to their colleagues. Role playing must be taken seriously in order for all teachers to gain an understanding of ITV experiences from the teachers' as well as the students' perspectives.

F. Each training session must have periodic follow-up inservices and on-site coaching to ensure long term benefits of the training.

G. All teachers must be volunteers for the training and for teaching over ITV systems.

Other considerations for staff development include training substitute teachers, providing a general training session for students, and general information sessions for those teachers who are undecided as to their involvement or acceptance of the ITV system.

A quality staff development model will help to alleviate many potential problems. However, as with any new idea or change within an institution, there will be many concerns that will have to be dealt with. The following list contains typical teacher concerns but constitute only a portion of the potential number that will arise.

1. How does the teacher overcome the apparent lack of mobility within the ITV classroom?
2. How do techers handle discipline?
3. What is needed to adapt curriculum materials to ITV?
4. Is there interpersonal "breakdown" between teachers and students?
5. Should calendars, bell schedules and other policies be coordinated? How is that handled?
6. What are the effects of delays with paper exchange on the teachers' effectiveness?
7. If there is a technical breakdown, who is responsible for repair?
8. Who is legally responsible for the students in the remote sites?
9. How is curriculum coordination among the school districts handled?
10. Can the teacher adjust from using the chalkboard to the overhead camera?
11. What types of administrative support can the teachers expect?
12. What is the ideal class size? What is the ideal number of remote classrooms?
13. Who trains substitute teachers?
14. Can guest speakers' presentations be transmitted via ITV?
15. How are parent/teacher conferences handled?
16. How is collective bargaining handled? What are the contract issues involved?
17. Do teachers receive extra preparation time for ITV classes?
18. Who will videotape teachers and for what reason?
19. Will ITV cause a loss of teacher jobs?
20. Where will the classroom be located and who will design it?

Final Staff Development Recommendations

1. Provide teachers who are involved in the staff development model with a list of teaching techniques and encourage them to expand them as they gain experience with ITV.

2. Make staff development a top priority and do not overlook substitute teachers as one audience.

CLASSROOM MANAGEMENT

Effective classroom management is the one area that will overcome many potential ITV obstacles and will provide teachers with a better feeling for using ITV. Classroom management will be used here as an area that covers both the technical and the educational management aspects of ITV.

Technical

1. The ITV classrooms must all be similar so that teachers in all districts will feel comfortable with teaching from any site.

2. Have a telephone and facsimile machine located in or very near the ITV classroom for paper exchange and instant communications with all remote classroom sites.

3. Place the student cameras in each ITV classroom so that the camera can not only monitor all students but the ITV classroom door. This will provide teachers with a method for determining who enters or exits the classroom during each class.

4. For indirect supervision of remote sites, the placement of the ITV classroom should be located near the library, media center, office or any place where adults are present on a regular basis. Also, television monitors may be placed in the principal's office, the cafeteria or the school's commons area for additional indirect supervision.

Educational

1. It is helpful if the ITV teacher is a flexible, well organized individual. Technology can many times be frustrating to deal with, and a sense of humor will be of great benefit.

2. Use of effective elements of instruction are crucial to the success of the ITV class. Areas of strong consideration are active participation, established

procedures for asking questions during class, checking for understanding and use of appropriate ITV teacher techniques.

3. Maintaining eye contact with the "home" site students directly or with the remote site students by teaching to the camera is important to enhance interaction.

CONCLUSIONS AND RECOMMENDATIONS

Conclusions:

1. Experience has indicated that interactive television can be used effectively for the instruction of advanced high school academic and business courses. There is insufficient data to determine the effectiveness of instruction through this technology for lower level or remedial, middle school, or arts courses. There is also insufficient data to establish the quality or permanence of student learning through interactive television, in contrast to more traditional instructional techniques.

2. Since interactive television has been used primarily to solve problems of insufficient enrollment and inadequate staffing, remote-site monitoring and supervision have been understandably minimal. Thus, a high level of student maturity and self-discipline has been requisite. Whether the less highly disciplined student could be motivated through the medium of interactive television without dramatically increasing on-site supervision has not been determined. Similarly, the still-experimental nature of the technology has relegated it to a marginal role in the ongoing school program. Thus, any on-site supervision has come at the expense of existing supervisory responsibilities. As the use of this technology increases, alternative supervisory procedures will become possible, and alternative supervisory procedures will become possible, and alternative conceptions of the supervisory role may develop.

Recommendations:

1. That the use of interactive television as an instructional medium for the teaching of advanced business and academic courses (specifically foreign languages), be contingent on the condition that:

    a. enrollments in these courses are insufficient to their traditional offering;

    b. student enrollment in these courses be on an exclusively voluntary basis with careful prescreening for motivation and maturity;

    c. qualified, certified staff exist in at least one of the cooperating school districts;

d. staff undergo direct training in the technology before being permitted to teach, such training to include curricular planning specific to the technology and direct experience in learning through the technology; and

e. a comprehensive and detailed evaluation plan be implemented in concert with the instruction to assess student achievement, relative permanence of student learning, and teacher and student satisfaction with the instructional use of the technology, both from the cognitive and affective perspectives.

2. That selected pilot programs be initiated, under careful supervision and monitoring, to assess the applicability of interactive television technology for:

   a. lower level or remedial courses (academic or business);

   b. middle school or upper elementary school courses (academic or business); and

   c. "non-participatory" arts courses (art history, music appreciation, etc.).

3. That specific training courses for teachers be developed, focusing on the following issues in interactive television instruction:

   a. curricular planning - pacing, adjustments, alternatives;

   b. the special characteristics of the teaching-learning process in interactive television instruction;

   c. presentational techniques using the unique qualities of interactive television (motivation, encouraging "intimacy," stimulating thought of discussion, etc.);

   d. assessment of student academic learning;

   e. student management and discipline issues; and

   f. the logistics of multiple-site management.

4. That specific training courses for supervisors and administrators be developed and offered, focusing on the

following issues in interactive television instruction:

a. management and coordination of multiple sites;

b. providing instructional support to teachers; and

c. attendance, grading, crediting and reporting issues.

There are five basic sources of information which have been used in the preparation of this report:

A. Technology in Education: Two-Way Interactive Television - a report produced by the East Central Minnesota Educational Cable Cooperative (ECMECC) and the Minnesota Council on Quality Education (1985)

B. A collection of materials on existing interactive television programs provided by Mr. Will Kitchen of Tele-Systems Associates, Inc., Minneapolis, MN.

C. Existing information on educational programming in Westchester County and New York State in general, with particular emphasis on local secondary school curricula and demographic data on Westchester County schools.

D. Distance Learning Feasibility Study, Westchester Distance Learning Advisory Committee

E. Distance Learning in Westchester County, Analysis and Implementation Plan produced by Tele-Systems Associates, Inc., Minneapolis, MN.